Financial Incentives for Environmental Management Systems (EMS)

Project Findings from Phase I

U.S. Environmental Protection Agency
Financial Market Incentives for EMS Steering Group

December 2006

Acknowledgements

The Financial Market Incentives for Environmental Management Systems (EMS) Steering Group, comprised of staff from various Environmental Protection Agency offices, developed this report. The Steering Group spent more than a year learning about the financial sector—the insurance, bond, and equity markets in particular—and the potential for these markets to place greater value on organizations that reduce risk and improve environmental performance using EMSs. This report captures the Steering Group's learning from Phase I of the project.

This report would not have been possible without the contributions of the following workgroup members: Shana Harbour, Chair (Office of Policy, Economics and Innovation), Bill Hanson (Office of Policy, Economics and Innovation), Vanessa Bowie (Office of the Chief Financial Officer), Robert Lee (Office of Pollution Prevention and Toxic Substances), Jon Silberman (Office of Enforcement and Compliance Assurance), James Horne (Office of Water), Jack Simmons (Office of Research and Development), Sol Salinas (Office of International Affairs), George Faison (Office of Solid Waste), Kathleen Bailey (Office of Policy, Economics and Innovation), Chad Carbone (Office of Policy, Economics and Innovation), Dale Ruhter (Office of Solid Waste), Kevin Easley (Office of Policy, Economics and Innovation), Charles Sutfin (Office of Solid Waste and Emergency Response), Larry Zaragoza (Office of Solid Waste and Emergency Response), Michael Kane (Office of Policy, Economics and Innovation), Walt Tunnessen (Office of Air and Radiation), Rich Iovanna (Office of Research and Development), Jeffrey Kohn (Office of Policy, Economics and Innovation), Linda Fiedler (Office of Solid Waste and Emergency Response), and Timothy McProuty (Office of the Chief Financial Officer).

The Steering Group was supported by Casals & Associates under the provisions of GSA MOBIS Federal Supply Schedule No 874-1 Contract No. GS-10F-0411M Requisition No PR-DC_05-00474/U41506.

Executive Summary

This report describes the methodology and findings of a study completed by Environmental Protection Agency's (EPA) Financial Market Incentives for Environmental Management Systems (EMS) Steering Group. The study, which lasted 10 months (March-November, 2005), focused on whether or not the financial sector places greater value on organizations that use EMSs. More specifically, the Steering Group:

- Reviewed existing literature for connections between EMS (or environmental management and performance) and financial value;
- Examined methods used by insurance, equity, and fixed income investing experts to determine if EMS and environmental performance is included in their analyses; and
- Searched for examples where EMS implementation resulted in tangible financial benefits.

We began this project by conducting a literature review to find connections between EMS (or environmental management and performance) and market valuation. We then initiated dialogue with insurance underwriters and brokers, equity analysts and portfolio managers (both mainstream and Socially Responsible Investment), corporate investor relations and environmental executives, bond raters, and financial industry experts to determine how EMSs are currently considered in the marketplace. We also searched for specific examples of financial value creation through EMS implementation. Our findings are based on interviews with key players in the financial sector and corporations, informal dialogues with and presentations by guest speakers, and insight gained via conferences and other forums.

Literature Review Results

The Steering Group identified several relevant results during its literature review. The most significant are described below.

- **Environmental and Financial Performance Are Positively Associated—**Studies yield findings ranging from no negative impact to a substantial positive impact. Unmanaged environmental liabilities can decrease profitability, increase volatility, and corrode equity and bond valuations, independent of sector, size, and investment style.
- **Intangibles Are Increasingly Seen as Significant Value Drivers—**Intangible assets (e.g., brand strength, reputation) now account, on average, for more than 80 percent of stock prices and are increasingly important in investor valuation of company risk and opportunity. Evidence in the literature suggests that environmental management quality might be one such valuable intangible asset.
- **Equity Markets React to Environmental Events—**Environmental issues can affect stock market and company valuations. Studies have documented short- to medium-term stock market value effects from positive and negative environmental events.
- **Investor Awareness and Interest Are Limited, But Growing—**While consideration of environmental issues and EMS, is limited in U.S. capital markets, environmental performance

has received increasing interest from both investors and corporate chief financial officers, generally under the broader category of sustainability or corporate social responsibility (CSR).

Despite an extensive review, we found little published literature addressing environmental management, risk, or performance in the context of fixed income investing or insurance underwriting.

Findings from Primary Research

We present our findings in two categories: how the financial sector currently views EMS, and the data-related or other issues that affect the financial sector's consideration of EMSs.

Current Use of and Views Regarding EMS in the Financial Sector

Most of our contacts expressed strong interest in EMS as a concept, believing it has potential to manage environmental issues with financial implications more effectively and consistently than would be possible otherwise. Many identified several EMS features as worthwhile. Investors and insurers support a clear description of organizations' environmental risks and long-range objectives and strategies, as well as management structure and accountability. Investors and insurers agree that defining specific targets, performance metrics, and monitoring and reporting activities are crucial. They also value evidence of tight management controls, ranging from written procedures, documentation, and training, to corrective/preventive action processes and independent internal auditing. Most also believe that an EMS should be defined at the highest levels of an organization and address significant business and financial objectives and activities. An EMS can address both legal compliance and other environmental issues that might create business risks and opportunities.

Financial market representatives did differ, however, on the importance of specific EMS elements and how those elements might meet their needs. Investors value the presence and effectiveness of mechanisms that show senior management engagement (e.g., environmental management/ governance structure, management review). They also require data that represent a company's performance (e.g., performance measurement activities, internal auditing, and external reporting processes). In contrast, insurers are most concerned about whether the organization has identified and is actively managing environmental issues from a liability control standpoint. They emphasize extensive written procedures, evidence of adequate training and staffing resources, and corrective/preventive action processes.

Data-Related or Other Issues that Affect Financial Sector Consideration of EMSs

Insurers and investors identified several barriers to using EMSs in their evaluation processes. There is wide variation in how EMSs are implemented. This situation produces problems for analysts, because they conduct evaluations using standardized methodologies, which require consistent, comparable data. Our contacts expressed concerns that evidence of EMS results was often absent, unclear, inconsistent, and/or insignificant to their evaluations.

Environmental insurers believe that those who might advocate more favorable underwriting policies and/or insurance rates for organizations implementing EMS must demonstrate that the specific EMS at a particular location has produced tangible, risk-reduction benefits (i.e., lower underwriting risks).

While most SRI practitioners view EMS as a plus, the information it yields is not comparable among different companies, making it hard to quantify benefits. EMSs are not yet viewed as reliable, consistent predictors of environmental performance.

Mainstream investors typically do not make investment decisions based on the presence or attributes of EMSs, and we found little information related to fixed income investors' interest in environmental management or performance.

Emerging Trends

While we were pursuing our research on the interface between EMSs and financial value, several interesting and relevant trends emerged.

- Interest in environmental issues and performance is perceived by many to be increasing both in investment firms and in the companies in which they invest.
- Disclosure requirements for pubic corporations have been strengthened significantly during the past two years. As a result, corporations have disclosed more information on environmental issues
- Institutional shareholders are increasingly asking for management action to define environmental/sustainability policies, actions, measurement, and reporting.
- Major insurance companies are bringing renewed attention to environmental and sustainability issues.
- A number of companies—including some of the largest companies in the world—are seeking to turn environmental issues to their business advantage.

These trends will likely shape the interests and behaviors of financial sector participants relative to EMS and environmental issues in the coming years.

During the second phase of this project, the Steering Group plans to initiate a dialogue that will provide insight on the types of EMS data that might be of value to the financial markets. The Steering Group is also considering several small research projects that might inform this dialogue. Additionally, EPA's Environmental Finance Advisory Board has accepted a "charge" to advise the Agency on this project.

Contents

I. Introduction

This report describes the methodology and findings of Environmental Protection Agency's (EPA) Financial Market Incentives for Environmental Management Systems (EMS) project. This project was performed by a Steering Group comprised of staff from various EPA offices, and focused on whether and to what extent the financial sector provides incentives to organizations that use EMSs. When implemented effectively, an EMS can result in both environmental and business benefits. Incentives provided by the financial sector, however, might offer additional motivation for organizations to reduce environmental impacts and risk through the use of EMSs.

The Steering Group spent more than a year learning about the financial sector—the insurance, bond, and equity markets in particular—and the potential for the financial sector to provide incentives to organizations that reduce risk and improve environmental performance using EMSs.

More specifically, we:

- Reviewed existing literature for connections between EMS (or environmental management and performance) and market value;
- Initiated dialogue with representatives from insurance and equity and fixed income investing, about whether and/or how they evaluate an organization's environmental management to determine how EMSs are currently considered in the marketplace; and
- Searched for examples where EMS implementation resulted in tangible financial benefits.

EMS — a continual cycle of planning, implementing, reviewing, and improving the processes and actions that an organization undertakes to meet its business and environmental goals.

To read EPA's position statement on EMS or learn more about EPA's related policies, technical assistance and outreach programs, and other initiatives, visit www.epa.gov/EMS.

Throughout these activities, the Steering Group focused on two objectives:

1. Determine whether and to what extent EMS is considered in investment analysis, portfolio development, insurance underwriting, and other activities within certain financial markets; and

2. Gain a better understanding of:
    a. Financial community evaluation and decision making;
    b. Situations in which an organization's environmental management is or might be considered;
    c. Methodologies currently used by the financial sector;
    d. The presence, role, and importance of EMS in evaluation;
    e. Financial benefits for EMS implementation; and
    f. Limitations and concerns that inhibit EMS use.

The remainder of this report is comprised of three sections. Section II describes methodology. Section III presents our findings, and Section IV presents our conclusions and discusses the next phase of this project. Appendix A provides more detailed information on major literature findings. Appendix B contains a list of our primary financial sector contacts. A brief overview of environmental management systems can be found in Appendix C, and a glossary is provided in Appendix D.

II. Methodology

First, the Steering Group conducted a literature review to determine the relationship between environmental management and/or performance and market behavior.

We considered two basic sets of questions during this review:

- Are environmental and financial performance related? If so, is there evidence of this relationship?
- Are financial market participants paying attention to environmental issues? Is there evidence of attitudinal and behavioral change in capital markets?

We chose literature (e.g., academic and professional journals, association reports, government sources, business press) for review based on its source/sponsor, type of incentive considered, and scope. We focused on research that was produced independently of the organizations and/or industries being studied, and, therefore, attempted to limit obvious or potential bias. We looked for literature that was broad in scope—i.e., market or industry-wide. In evaluating the research, we assigned more weight to works that offered a clear research hypothesis, valid methods, rigorous data development, and fully supported conclusions. In all, we examined more than 50 studies, reports, and articles, and discuss here specific findings from about 20 studies (see Appendix A). The literature review was completed in March 2005, meaning that our literature review findings might not be completely current. However, ongoing developments reported in the broader literature and mass media are briefly summarized in the final portion of Section III.

Following the literature review, we focused on researching how insurers and investors make underwriting and investing decisions as well as under what circumstances environmental management and EMSs are considered during the decision-making process. We also searched for financial sector limitations or concerns about including environmental considerations in evaluation and decision-making processes, and any examples of financial benefits conferred through EMS implementation.

To get firsthand knowledge of whether and how EMSs are considered in financial sector decision making, we spoke with several key players in the insurance, bond, and equity markets, as well as responsible individuals in major public companies. We also held several informal dialogues with financial sector representatives from bond rating agencies, insurance companies, brokerage firms, law firms, academic institutions, and interested non-governmental entities. For a complete list of our financial sector contacts, see Appendix B.

After collecting information via these methods, the Steering Group analyzed and consolidated data where appropriate and drew comparisons across groups. Major findings are described in Section III.

III. Findings

This section begins with insight gained from the literature review. The Steering Group then presents its findings based on our dialogues with representatives from the financial community, and from additional learning via conferences, workshops, training, and other activities. The section concludes with a brief summary of emerging trends.

Literature Review Findings

We developed several relevant findings during the environmental finance literature review. The most significant are described below. The literature review was completed in March 2005, meaning that our literature review findings might not be completely current. For more detail, see Appendix A.

Despite an extensive review, we found little published literature addressing the relationship of environmental management, business risk, and financial performance in the context of fixed income investing or insurance underwriting. Most studies focused on internal corporate financial results or investor behavior in equity markets.

Environmental and Financial Performance Are Positively Associated

We found that the literature contains empirical data and analysis that shows a positive relationship between environmental and financial performance.[1] Numerous studies yield findings ranging from no overall negative impact to a substantial positive impact. We also found that unmanaged environmental liabilities can decrease profitability, increase stock volatility, and corrode equity and bond valuations. These financial effects are independent of sector, size, and investment style.

- Two studies (Cohen, Fenn, and Naimon,1995; Stone, Guerard, *et al*.,2003) demonstrated that there is no "performance penalty" for investing in environmentally screened firms or funds.[2]
- Three studies (Hart and Ahuja, 1996; Russo and Fouts, 1997; and Stanwick and Stanwick, 1998) showed return on assets/net margin is improved by pollution prevention and emissions reductions, meaning that well-chosen pollution prevention initiatives more than pay for themselves at the level of the firm, as well as at the project level.
- Two studies (Feldman, Soyka and Ameer, 1997; Garber and Hammitt, 1998) reported that environmental management / environmental performance improvements reduce stock price volatility while greater environmental liabilities increase stock price volatility. Lower volatility typically results in higher stock prices because volatility is a major component of investment risk, and investors require compensation (a higher investment return) to accept higher risk.

[1] It is important to remember, however, that empirical studies of this type routinely rely upon statistical correlation and other quantitative methods to prove or disprove a research hypothesis. While such studies can lend strong support to a postulated causal relationship, neither they nor other methods can conclusively demonstrate causality.

[2] These studies provide support for overcoming the traditional view that fiduciary responsibility precludes consideration of environmental factors in pension or mutual fund investing.

Intangibles Are Increasingly Seen as Significant Value Drivers

The literature showed that intangible assets (e.g., brand strength, reputation) now account, on average, for more than 80 percent of stock prices and are increasingly important in investor valuation of company risk and opportunity. No longer are companies valued primarily on the basis of how many factories they own, or how much cash they have on hand. Today, investors care much more about the attributes that will make a company successful in the future than about what it owns. These "soft" assets have become much more important as the economy has become more services-oriented, global, and competitive. We found evidence in the literature that suggests environmental management quality might be one such valuable intangible asset.

- Studies (Dowell, Hart, and Yeung, 2000; Konar and Cohen, 2001) showed that intangible asset value is higher for multinational corporations going beyond the bare compliance minimum, and lower for firms/industries with higher pollutant (TRI) emissions.
- Empirical research performed by several organizations has demonstrated that the following issues are both highly relevant to investors and, to some degree, insurers, and have linkages to management of environmental issues:

Example of Intangible Assets

- Values and Image
- Strategy and Tactics
- Risk Management
- Quality and Responsiveness
- Supply Chains and Alliances
- Organizational Development
- Innovation, Intellectual Capital Formation, and Branding
- Stakeholder (including customer) Relations
- Performance Measurement (environmental and financial)
- External Reporting and Transparency

Equity Markets React to Environmental Events

The literature review showed that environmental issues can affect stock market and company valuations. Several studies have documented short- to medium-term stock market value effects from positive and negative environmental events. For example, media coverage based on actual and potential environmental legislation can significantly decrease share price of affected companies. In addition, EPA announcements about enforcement priorities and negative news releases had similar effects. In contrast, positive publicity on environmental performance (e.g., awards, recognition) increased share prices.

- One study (Hamilton, 1995) found that effective past environmental disclosure helped chemical companies protect themselves from a market value reduction after a negative environmental event (e.g., catastrophic chemical release).
- The literature showed these impacts are often sector-dependent; i.e., companies in some sectors are affected more by negative/positive information than companies in other sectors.

Investor Awareness and Interest Are Limited, But Growing

The literature review showed that consideration of environmental issues, much less EMS, is limited in U.S. mainstream capital markets. When included at all, environment is generally viewed from a negative perspective (e.g., risk of accident, unknown legal liability, damage to reputation).

Individual portfolio managers do have a strong interest in receiving information, including environmental information that helps them better understand a firm's future value creation and cash flow generation potential, and risk profile. In recent years, many investors and corporate chief financial officers have begun to focus greater attention on environmental performance, generally under the broader category of sustainability or corporate social responsibility (CSR).

- An earlier (1990s) study (Soyka and Feldman, 1998) found that while virtually no investors routinely asked for how environmental, health, and safety programs affect company value, all expected companies to offer such information without prompting.
- A more recent study (UNEP-FI, 2004), in which 11 stock brokerage firms were surveyed, concluded that investors agree that environmental, social, and corporate governance issues can affect long-term shareholder value.

Findings from Primary Research

With the literature review as a foundation, the Steering Group sought to gain a fuller understanding as to whether and how participants in the financial markets consider EMS and other environmental management improvements in their decision-making processes. More specifically, we initiated dialogue with insurance underwriters and brokers, equity analysts and portfolio managers (both the mainstream and socially responsible investment communities), corporate investor relations and environmental executives, bond raters, and financial industry experts to determine how EMSs are currently considered in the marketplace (see Appendix B). We also searched for specific examples of financial value creation through EMS implementation. Our findings are based on interviews with key players in the financial sector and corporations, informal dialogues with and presentations by guest speakers, and insight gained via conferences and other forums.

This section is divided into three subsections. We first briefly describe the major financial market components that were the focus of our research. We then present information and perspectives offered by representatives of these market components, regarding how they currently use and view EMSs. Finally, we discuss some of the limitations and factors influencing interest in EMS, as reported by financial community representatives.

Financial Market Sectors: Who They Are and What They Care About

While the equity, bond, and insurance sectors are all important parts of the overall financial market in the United States, they differ from one another in some important ways. In the insurance relationship, the company is the customer. The insurer seeks to write policies with companies that are cost-effective and ongoing (multiyear). In contrast, equity and bond market participants are the company's customers. Companies seek financing through issuance of stock or fixed income securities. And for stock shares already issued, companies actively engage the equity market and its analysts.

Insurance underwriting includes actuarial analysis, which tends to be detailed and site-specific. Since the 1980s, insurance companies have generally excluded coverage for environmental issues from their general liability policies, and instead issue specific policies to address a variety of environmental risks. Environmental insurance is a very small part of the overall insurance market, representing about one percent of the total insurance market in the United States. The limited number of insurers that provide environmental insurance are quite knowledgeable of environmental issues. Many are also very familiar with EMS and understand its potential for stimulating environmental performance improvement and risk reduction. In performing our primary research, we initiated dialogue with senior insurance executives and underwriters at four companies that, together, underwrite the majority of environmental insurance products in the United States.[3]

Bond and equity market participants and their posture toward environmental issues can be classified into two major groups: mainstream investors and socially responsible investors (SRI). . Socially responsible investing (SRI) reflects a desire by investors to own stocks that represent their values and preclude stocks that may be in conflict with their personal values. In the past, SRI functioned primarily by screening out companies in particular target sectors such as tobacco, alcohol, gambling, defense, nuclear power, etc. During the past 10 years, however, SRI investment decision making has become more sophisticated with the use of screening devices that include dozens of variables and/or multi-factor models. SRI investors typically examine environmental issues in detail using screening criteria methods, which in many cases include consideration of EMS. Importantly, SRI now accounts for about one in ten dollars invested in the United States (Social Investment Forum, 2006).

Mainstream investors comprise the majority of those buying and selling equity and fixed income securities in U.S. markets. They have limited awareness of and reaction to environmental issues, much less EMS. To the extent that the environment is considered at all by mainstream investors, it is more than likely viewed from a negative perspective (e.g., risk of accident, fines and penalties, unknown legal liability, damage to reputation), a finding that parallels those of our literature review. As discussed above, however, published studies and surveys indicate that mainstream markets as a whole do react to significant environmental news, whether positive or negative, and individual portfolio managers do have a strong interest in receiving information of any kind (including environmental) that helps them better understand a firm's value and future prospects.

In the subsections that follow, the Steering Group discusses what we learned through our dialogue with senior representatives of each of these financial market sectors, regarding the value of EMS to them and EMS's current and possible future utility for investing and underwriting decision making in U.S. capital markets.

[3] Many environmental insurance industry personnel (at all levels) have previous experience as employees in the environmental services industry or in corporate environmental management. As a result, the general level of knowledge of EMS and related concepts is higher in this sector than in most other financial market sectors.

Current Use of and Views Regarding EMS in the Financial Sector

Across the three financial market sectors, participants held a number of views on EMS and its utility for analyzing company risk and reward potential. Given that the business, objectives, risk exposure, and evaluation methods vary somewhat across the financial sectors, this section first discusses common themes and areas of agreement and then presents individual market sector perspectives and differences.

Most financial sector representatives with whom we spoke expressed strong interest in EMS as a concept, believing it has potential to manage environmental issues with financial implications more effectively and consistently than would be possible otherwise. In fact, many identified several EMS features as particularly worthwhile. Investors and insurers support a clear description of organizations' environmental risks and long-range objectives and strategies, as well as management structure and accountability. Investors and insurers agree that defining specific targets, performance metrics, and monitoring and reporting activities are crucial to characterize future risk and financial performance potential. They also value evidence of tight management controls, ranging from written procedures, documentation, and training, to corrective/preventive action processes and independent internal auditing.

Most investors and insurers believe that an EMS should be defined at the highest levels of an organization. They believe that EMS should also address significant business and financial objectives and activities. And contacts stated that EMS can effectively address legal compliance and other organizational obligations, while further addressing other environmental issues that might create business risks and opportunities.

EMS is valued, at least informally, by many in the financial market for its:

- ✓ Explicit environmental policy, scope, and management structure;
- ✓ Specific targets and metrics;
- ✓ Defined structure and responsibilities;
- ✓ Written procedures and documentation;
- ✓ Training;
- ✓ Corrective action;
- ✓ Performance measurement and data;
- ✓ Internal auditing;
- ✓ Internal and external reporting; and
- ✓ Management review capabilities.

Financial market representatives did differ, however, on the importance of specific EMS elements and how those elements might meet their needs. Investors value the presence and effectiveness of mechanisms that show senior management engagement (e.g., environmental management/governance structure, management review). They value data that represent a company's performance (e.g., performance measurement activities, internal auditing, and external reporting processes). In contrast, insurers are most concerned about liability control: Has the organization

identified and actively managed their insured environmental aspects and risks? They emphasize extensive written procedures, evidence of adequate training and staffing resources, and corrective/preventive action processes.

SRI Investors

Several investors from socially responsible investing (SRI) funds noted that EMSs can improve environmental performance and reduce future environmental risks when implemented effectively. SRI investors specifically look for firms that have the environmental management function directed by the board of directors and chief executive officer (or equivalent). They also expect senior management to directly oversee internal and external communications and reporting mechanisms, as well as auditing processes. Within reporting structures, they look for target setting and reporting against targets. These issues demonstrate the intersection of environmental management and corporate governance. At a minimum, SRI investors expect EMS to provide data for documenting improved environmental performance (e.g., a reduced environmental footprint) over time. Because they invest in a company—not in a specific facility—investors also look for company-wide policies, procedures, and systems that will potentially affect their investment.

Mainstream Investors

We found little evidence that mainstream investors formally use the presence or absence of an EMS or operational environmental performance in their evaluation methods. One representative of a major brokerage stated that although environmental issues may be taken into account while evaluating a company, environmental considerations generally are not significant enough to affect the stock price. Discussions with other mainstream investors yielded similar views.

Insurers

Insurance underwriters cited two particular EMS benefits. The first is related to the desired cultural shift that occurs when organizations develop an environmentally/safety-conscious culture in which improved environmental and worker safety performance is viewed as everyone's responsibility. This belief then becomes ingrained as an organizational value. One insurance company representative indicated that EMS is useful, because it provides a means to promote, capture, and measure this shift. The second benefit is that while EMS adoption *per se* might not produce lower premiums, it might create a greater comfort level in the underwriter, resulting in greater underwriting flexibility. This flexibility might mean fewer exclusions, lower deductibles, and/or additional endorsements. In other words, the insured might receive a better policy for the same cost.

Corporate Investor Relations and Environmental Representatives

Our conversations with senior corporate investor relations and environmental representatives revealed a number of different views on the financial benefits of EMS and the degree of interest in EMS shown by financial community stakeholders. Most strongly believe that formal EMSs and environmental programs contribute to the overall financial performance of their organization. Benefits attributed by both environmental and investor relations executives included reduced costs, pollutant emissions, and waste generation; greater responsiveness to customer desires; and enhanced ability to attract, motivate, and retain employees, maintain their "social license to operate," and achieve greater operational flexibility. However, several also stated that they have not quantified these benefits, and

doing so would be virtually impossible. Therefore, how environmental/EMS considerations should be defined and related to company financial value remains an area for additional research[4].

Corporate representatives also provided valuable perspective on the ways in which EMS might fit into larger-scale corporate management and governance activities. Within some firms, environmental management is viewed more broadly than EMS and driven by a strong internal ethic. In these cases, EMS might be part of a higher-level corporate governance structure that addresses environmental and other issues.

Our dialogues with company representatives yielded some interesting examples of how different firms address the environmental component of their overall governance responsibilities. Companies like Starbucks are very proactive on environmental management issues, but do not have a formal EMS. Other companies, such as Intel, also focus on environmental management, but have not adopted a formal EMS as part of their efforts. In addition to its EMS, Intel builds and maintains stakeholder relationships, in part, through environmental reporting and disclosure.

Data-Related or Other Issues that Affect Financial Sector Consideration of EMS

Despite a general interest in EMS within financial markets, our conversations with a wide array of financial representatives indicate that EMSs are not typically included in environmental insurers' or investors' evaluation processes (either socially responsible investment or mainstream). While some insurers and investors are uninterested in environmental issues, many others would like to introduce and/or integrate environmental issues into their processes. How best to accomplish this effort in a formal and structured way, however, remains an area for further development in most insurance companies and investment firms.

Insurers and investors have identified several barriers to using EMSs in their evaluation processes. Even with a global EMS standard, ISO 14001—which describes a complete, well-functioning EMS and how it works—there is wide variation in how EMSs are implemented and their performance reported. These inconsistencies among corporate and facility EMSs produce problems for analysts, because they conduct evaluations using standardized methodologies. Standardized methods require consistent, comparable data. In addition, because EMSs are most often implemented at the facility level, they might not produce environmental performance or other data that are useful for investors' corporate-wide analyses. This problem is compounded by firms' use of different EMS implementation approaches—even within the same industry. Inconsistent EMS implementation also limits insurers' ability to consider products, packages, and pricing structures for industries that adopt EMS as a goal or requirement.

Representatives from the different financial sectors with whom we spoke validated these general findings and expressed concerns that evidence of EMS results was often absent, unclear, inconsistent, and/or insignificant to their evaluations. More detailed information on the specific concerns voiced

[4] Two well-known examples of how organizations are beginning to consider environmental quality as an intangible value driver are Innovest Value Advisors, which characterizes the environmental variable as "strategic environmental management," and the Global Environmental Management Initiative, which uses "environmental and social reputation." For example Innovest sells its research reports to both mainstream and SRI investors.

within each of these financial sectors—insurance, social responsibility investment equity, and mainstream equity investing—follows.

Insurers

Environmental insurers do not view EMSs – by themselves -- as a reliable indicator of future environmental risks because they do not provide actionable information in most cases. Several insurance company executives with whom we spoke indicated, however, that those who seek benefits for an EMS should demonstrate that the specific EMS at a particular location has produced tangible, risk-reduction benefits (i.e., lower underwriting risks). If this burden of proof is met, insurance industry representatives might be willing to entertain possible future premium and/or term improvements.

Because industry- and site-specific considerations dominate the environmental insurance underwriting process, an EMS should show how it resolves or improves:

- **Industrial/chemical operations—**presence of hazardous or otherwise regulated chemicals, hazardous waste generation/management, fuel tanks, etc.;
- **Compliance, release, and litigation history—**ongoing compliance, release reductions, and absence of litigation;
- **Community relationships—**an indication of the approach to and effectiveness of stakeholder management and overall environmental management quality; and
- **Waste management practices—**approach for managing non-product outputs (e.g., evaluation of off-site disposition), which might be viewed as an indicator of overall environmental management quality and risk potential.

SRI Equity Investors

Most socially responsible investing (SRI) practitioners contacted for this report, believe that environmental certifications (e.g., ISO 14001 EMS), while useful, cannot be used as threshold or determinate criteria because EMS in practice are not seen as consistent indicators of environmental performance. While most SRI firms view EMS as a plus, the information derived from an EMS usually is not comparable among different companies, making it hard to quantify how much of a benefit EMS conveys. SRI firms instead rely more on documented environmental performance for assessing overall environmental management quality. In some cases, environmental performance data is also used to evaluate the quality of environmental programs, including EMS.

Mainstream Equity Investors

Our research suggests that mainstream investors do not make investment decisions based on the presence of EMS. One reason is short-term orientation, which limits interest in programs (such as EMS) that provide subtle, medium- to long-term benefits. Another reason is that many mainstream investors use quantitative approaches to investment management. These approaches look not only for a strong statistical correlation between financial performance and environmental data, but also for a significant impact on financial performance. If the correlation is outweighed by other factors that can

be readily measured or predicted, environment considerations will not likely be included in the analyst's evaluation process[5].

Our research also confirmed that while mainstream investors and corporate investor relations personnel recognize that effective environmental practices contribute to shareholder value, they believe that specific effects are difficult or impossible to measure. Despite literature suggesting these connections, our research suggests that most mainstream investors have not challenged or expanded existing equity evaluation methods to include this perspective.

Fixed Income Investors

Other than anecdotal examples, we found little information related to fixed income investors' interest in environmental management or performance. However, investment theory and the limited number of conversations that we did have with fixed income investors suggest that they share many of the same needs and concerns as mainstream equity investors. Bond investors are interested in liquidity and cash flow, as well as many other factors used by equity analysts. In fact, bond investors actively examine profitability, growth, capital structure, and industry sector measures, to name a few.

EMSs are currently given little to no weight in the formal, financial market evaluation of a company due to the following concerns:

- ✓ Unclear, inconsistent terminology—a general "language problem;"
- ✓ Inconsistencies across organizations (e.g., EMS scope, goals/targets, measurement methods, etc.);
- ✓ No clear links to existing financial evaluation methods;
- ✓ No robust indicators that combine both environmental and financial dimensions;
- ✓ No standardized methods for measuring and reporting performance (aside from the Global Reporting Initiative and industry-specific codes of conduct);
- ✓ Limited environmental knowledge within the analyst community;
- ✓ Financial institutions' resistance to new analytical incentives or methods; and
- ✓ Lack of consistency and comparability (from period to period, and across organizations).

Emerging Trends

While we were pursuing our research on the interface between EMSs and financial value, a number of interesting and relevant trends emerged. This area is dynamic, and since the beginning of this project,

[5] One member of a major quantitative investment company said his firm established a positive correlation between environmental performance and financial performance, but the significance of corporate environmental data did not warrant inclusion in their quantitative investment model. This individual also said, however, that a fiduciary could reasonably base an investment decision on the environmental data, because a positive correlation exists. A frequent criticism from pension fund representatives is that they cannot make investment decisions based on anything other than pure financial evaluation, because their fiduciary duty is to maximize return for their pensioners.

the rate of change has continued to increase. As we became aware of these new trends and ideas, our thinking about the financial markets evolved from a focus on EMS to a more broad perspective.

Some of the more important trends include the following:

- **Both investment firms and the companies they invest in are showing greater interest in environmental issues and performance.** Recent surveys of corporate executives and money managers suggest that a majority of these financial market participants believe that, within a few years, environmental (as well as social and governance) issues will become more prominent, have the potential to meaningfully influence a firm's financial success and market value, and be more widely evaluated by investors. In addition, an increasing number of large, mainstream financial institutions have issued policies and commitments to sustainability and environmentally sound investing. For example, Goldman Sachs issued a far-reaching Environmental Policy Framework late in 2005. Also, Citigroup, Bank of America, JP Morgan Chase, and many other major commercial banks have endorsed the Equator Principles, which dictate a series of conditions for environmentally sound and socially equitable lending activities in the developing world.
- **Disclosure requirements for pubic corporations have been strengthened significantly during the past two years.** As a result, corporations have disclosed more information on environmental issues. All publicly traded companies are required to file financial statements (e.g., Form 10Q, 10K) at regular intervals with the U.S. Securities and Exchange Commission. These statements must identify material financial liabilities from environmental risks and existing problems. The Sarbanes-Oxley law (S-OX) was passed to help improve corporate governance and to ensure full disclosure of a company's actual and potential liabilities – both tangible and intangible. While there are no additional environmental disclosure requirements under SO-X, the statute does require certification of effective financial controls and the accuracy of financial reports. Company senior management will need to establish or verify adequate controls to ensure that mandatory environmental disclosure are complete and accurate.

  In addition, the accounting profession has issued (March 2005) a major revision to reporting rules clarifying how contaminated site liabilities must be assessed, recorded, and disclosed. Under Financial Accounting Standards Board (FASB) 143 and accompanying Interpretation 47, companies must now estimate the costs of cleaning up all of their properties that might be contaminated, and report these costs if, in total, they are significant. This requirement is expected to lead to a more accurate appraisal of liabilities and book value. Companies might become more aggressive in investigating and cleaning up their real estate assets. This situation might also accelerate the pace of urban revitalization, which is consistent with EPA's stated objectives.
- **Institutional investors are becoming more active in shaping the direction and practices of the companies they invest in.** About one-half of the total value of shares of stock in U.S. markets are owned by institutions such as pension funds, mutual funds, and insurance companies. These investors, as a class, tend to be diversified "universal" investors; i.e., they own shares of virtually all publicly traded companies. As a result, they tend to have a long time horizon, and prefer engagement to divestment if they perceive problems in the way a company is being managed.

Historically, these long-term institutional investors have given wide latitude to the management of the companies in which they have invested funds. There are many clear signs, however, that institutional investors are more active in shaping the direction and practices of their investment companies. Institutional shareholders are now increasingly requesting (and often receiving) management action defining environmental/sustainability policies, actions, measurement, and reporting. Currently, the most prominent examples are in the arena of climate change risk and carbon emissions. The Carbon Disclosure Project and the activities of the Investor Network on Climate Risk represent major efforts by institutional investors to bring about fundamental change in how corporations assess, control, and disclose their business and financial risks from climate change. These initiatives involve more than 100 major financial institutions that control more than $3 trillion in investment assets. In other words, this activism is at a level that cannot be ignored. In another example, the California Public Employees Retirement System (CalPERS), has launched a major effort to "green" its real estate holdings, which are extensive. This effort involves making buildings more energy efficient, constructing them with recycled and low-impact materials, and installing features that use or minimize storm water runoff, among other features.

- **Similar trends are taking shape in Europe**, in the form of European Union directives and country-level statutes. Following release of a 2001 recommendation on the treatment of environmental issues in company financial reports, several more specific directives have been issued. The EU Directive on Accounts Modernization requires companies to report on "non-financial" matters—including environmental and social aspects—in company "directors reports."[6] The 2004 Transparency Directive requires companies seeking a stock market listing to disclose risks associated with their capital assets, including environmental risks. Finally, the 2004 Environmental Liability Directive establishes, for the first time, a framework for national-level statutes that impose site assessment and cleanup responsibilities for contaminated property.
- **Major insurance companies that offer property and casualty, business continuity, and other commercial products are also bringing renewed attention to environmental and sustainability issues.** The insurance industry, in part, is concerned that the pattern of natural climatic disasters is changing and probably increasing. The insurance industry needs to provide insurance based on accurate predictions of future losses. If future losses cannot be accurately predicted, then coverage is not provided or is offered at substantially higher premiums. Much of the focus is on climate change risk, given the damage and economic loss experienced during the 2005 hurricane season in the southeastern United States. In addition, insurers are beginning to discuss emerging risks such as environmental damage to ecosystems.
- **The definition of fiduciary responsibility has been challenged**. Investors who manage money for others are bound by a concept called fiduciary responsibility, which means that these money managers have a duty to manage funds in a way that is in the best interests of those who entrust funds to them. Traditionally, fiduciary responsibility in investing has been defined by most trustees as maximizing financial returns at a given level of risk. Under this interpretation other non-financial criteria (e.g., environmental performance) are excluded from

[6] Analogous to an annual report in the United States.

the investment evaluation. This interpretation of fiduciary responsibility has been challenged.[7] New interpretations suggest that the fiduciary has no duty to maximize returns, but instead is required to implement a rational and appropriate investment strategy on behalf of its clients. In addition, due to their potential impacts on future risk and return, environmental (as well as social and governance) issues can be considered where relevant to any aspect of an investment strategy.

- **In response to these trends, a number of companies—including some of the largest companies in the world—are seeking to turn the environmental issue to their business advantage**. For example, in 2005 GE launched its "Ecoimagination" initiative. This initiative is an integrated, multiyear campaign that involves major investment in environmentally oriented research and development, marketing, and manufacturing across all of the company's major business lines. GE's goal is to generate $20 billion in new revenues within five years from this initiative, which certifies products under development for inclusion within the Ecoimagination brand. Thus far, GE has certified 17 products, ranging from train locomotives to water desalination systems.

[7] Freshfields, Bruckhaus, Deringer (2005), "A Legal Framework for the Integration of Environmental, Social and Governance Issues into Institutional Investment" study funded by the United Nations Environment Programme Financial Initiative.

IV. Conclusions

EPA's Steering Group has conducted extensive literature and primary research examining the points of intersection between advanced environmental practices such as EMS and the analysis and decision making performed within three financial market sectors: equity investing, fixed income investing, and insurance. Based on the results of this research, we offer here a number of conclusions.

The published literature provides empirical support for several important ideas. One is that a firm's environmental management quality and performance are reflected in its overall financial results, as indicated by firm-level (i.e., balance sheet and income statement) financial data. In other words, whether a company does or does not operate a strong environmental program can in many cases affect its financial performance in ways that can be seen and measured. Another major finding is that the firm's environmental management and performance can affect its value in equity markets; i.e., strong environmental programs and their results have been shown to be positively related to company stock prices in a number of empirical studies. Finally, at the level of the investment portfolio, research shows that environmentally screened and appropriately balanced portfolios [i.e., socially responsible investments (SRI)] perform as well as their non-screened counterparts, so at a general level, there is no performance penalty for investing in an SRI fund versus an otherwise comparable mainstream fund.

Our conversations with a substantial number and wide array of investors, insurers, analysts, and others in the financial markets of interest led us to conclude that many financial market participants are interested in environmental issues and intrigued by EMS. While their specific business and decision-making perspectives and data needs differ, investors and insurers both believe that EMS and similar, structured approaches offer several appealing and useful features. Unfortunately, the great variability in companies' approaches to EMS currently limits the extent to which EMS presence or data are formally considered by most investors and insurers. Accordingly, although many financial market participants view EMSs positively, it is difficult to quantify their [EMSs'] value and compare them across companies.

The Steering Group began its work at an interesting time. During this initial project phase of our work, we have become aware of a number of important trends that are beginning to influence the ways in which financial markets and corporations approach environmental issues. Increasing attention in the popular and business press, new disclosure requirements, shareholder activism, and other factors are inducing a growing number of companies to more fully evaluate and disclose their environmental impacts and risks, and in some cases, launch explicit business strategies focused on the environmental issue. The capital markets also are changing in terms of both their demands on companies for more complete disclosure, and in new internal commitments to environmentally sound lending and investment policies and practices. We believe that these trends will develop further and are likely to exert profound impacts in the coming years.

During the second phase of this project, the Steering Group plans to initiate a dialogue with the financial sector that will provide insight on the types of EMS data that would be of value to the

financial markets. The Environmental Finance Advisory Board has accepted a “charge” to advise the Agency on this project.

References

Barth, M. and M. McNichols. (1994). Estimation and Market Valuation of Environmental Liabilities Relating to Superfund Sites. *Journal of Accounting Research*, 32,177–208.

Cohen, M., Fenn, S. and J. Naimon. (1995). Environmental and Financial Performance: Are they Related? Investor Responsibility Research Center.

Dowell, G., Hart, S., and B. Yeung. (2000). Do Corporate Global Environmental Standards Create or Destroy Market Value. *Management Science*, 46,1059–74.

Feldman, S., Soyka, P., and P. Ameer. (1997). Does Improving a Firm's Environmental Management System and Environmental Performance Result in a Higher Stock Price? *Journal of Investing*, 6(4), 87-97.

Garber, S. and J. Hammitt. (1998). Risk Premiums for Environmental Liabilities: Superfund and the Cost of Capital. *Journal of Environmental Economics and Management*, 36, 93–94.

Hamilton, J. (1995). Pollution as News: Media and Stock Market Reactions to the Toxic Release Inventory Data. *J. of Environmental Economics and Management*, 28, 98–113.

Hart, S. and G. Ahuja. (1996). Does it Pay to be Green? An Empirical Examination of the Relationship between Emission Reduction and Firm Performance. *Business Strategy and the Environment*, 5, 30–37.

Konar, S. and M. Cohen. (2001). Does the Market Value Environmental Performance. *Rev. Econ & Statistics*, 83(2), 281-309.

Repetto, R. and D. Austin. (2000). Coming Clean: Corporate Disclosure of Financially Significant Environmental Risks. Washington, DC: World Resources Institute.

Russo M. and P. Fouts. (1997). A Resource-based Perspective on Corporate Environmental Performance and Profitability. *Academy of Management Journal*, 40(3), 534–59.

Social Investment Forum. (2006). 2005 Report on Socially Responsible Investing Trends in the United States: 10-Year Review. Washington, DC: Social Investment Forum Industry Research Program.

Soyka, P. and S. Feldman. (1998). Investor Attitudes Toward Corporate Environmentalism: New Survey Findings. *Environmental Quality Management*, 8(1), 1-10.

Stanwick, P. and S. Stanwick. (1998). The Relationship Between Corporate Social Performance and Size, Financial and Environmental Performance. *Journal of Business Ethics*, 17(2), 195-204.

Stone, B., Guerard, J., Gultekin, M., and G. Adams. (2001). Socially Responsible Investment Screening: Strong Evidence of No Significant Cost for Actively Managed Portfolios. http://www.socialinvest.org/areas/research/

United Nations Environment Programme Finance Initiative. (2004). The Materiality of Social, Environmental, and Corporate Governance Issues to Equity Pricing. New York: UNEP Finance Initiative.

Appendix A: Major Literature Findings

Major Literature Findings

The Steering Group identified several relevant findings during its environmental-finance literature review. The most relevant are described below.

Despite an extensive review, the Steering Group found little published literature addressing environmental management, risk, or performance in the context of fixed income investing or insurance underwriting. Most studies focused on internal corporate financial results or investor behavior in equity markets.

The data presented in Exhibit 1 provide information from several studies that examined firm financial performance or position using accounting-based measures, and how these measures changed due to environmental risks, liabilities, or performance. Three studies addressed profitability related to pollutant emissions or their reduction. Results showed a positive correlation between emissions reductions and profitability. This correlation extends the commonly held view that well-chosen pollution prevention initiatives more than pay for themselves by showing the same type of impact at the level of the firm, rather than at the end-project level.

Exhibit 1 also includes results from two studies on prospective environmental liabilities that argue the authors, should be recorded on affected companies' balance sheets under existing accounting rules. These liabilities can be large, quantified with some precision, and vary across firms in the same industry. In other words, these data would be of interest to investors and other members of the financial community if made available on a widespread, consistent basis.

Exhibit 1. Major Literature Findings – An Accounting Perspective

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Profitability/ Return on Investment	Hart & Ahuja	"Does it Pay to be Green?" *Business Strategy and the Environment* 1996	▪ Pollution prevention and reduced emissions positively affect returns on assets, sales, and equity within two years ▪ Effects are greater for higher-emitting firms – (127 Standard &Poor's manufacturing, mining, and "production" firms)
	Russo & Fouts	"A Resource-based Perspective on Corporate Environmental Performance and Profitability" *Academy of Management Journal* 1997	▪ Return on assets improves with better environmental performance – (243 firms over 2-year period (no utilities))
	Stanwick & Stanwick	"The Relationship Between Corporate Social Performance and Size, Financial and Environmental Performance" *Journal of Business Ethics* 1998	▪ There is a correlation between low emissions and high profitability among firms with a reputation for social responsibility – (102 to125 firms listed on Fortune Corporate Reputation Index with complete Toxics Release Inventory data for any of five years)
Balance Sheet Liabilities	Barth & McNichols	"Estimation and Market Valuation of Environmental Liabilities Relating to Superfund Sites." *Journal of Accounting Research*, (1994)	▪ Average unrecognized liability associated with Superfund is 28.6 percent of market value
	Repetto & Austin	"Coming Clean: Corporate Disclosure of Financially Significant Risks." *World Resources Institute,,* 2000	▪ Many companies projected to have significant asset impairment/costs from new requirements under likely new regulations – (13 large pulp/paper companies)

Exhibit 2 describes findings from two studies that examined the impact of environmental improvements (or lack thereof) on the value of a firm's intangible assets. It is increasingly recognized that traditional, balance sheet-based measures no longer provide investors with a complete view of a firm's strengths and weaknesses, future prospects, or worth in the marketplace. Instead, investors turn to intangible

Tangible vs. Intangible Value

"As recently as the mid-1980s, financial statements captured at least 75 percent on average of the true market value of major corporations. In the intervening years, however, that figure has dropped to a paltry 15 percent on average."

(*Baruch Lev, Intangibles: Management, Measurement and Reporting: Washington, D.C. Brookings Institution, 2001*.)

assets such as brand reputation and patent rights. The studies profiled in Exhibit 2 document the intangible asset value of environmental management standards and pollutant emissions. In both cases, the authors found a strong, positive correlation between improved, beyond-compliance environmental behavior and intangible asset value.

Exhibit 2. Major Literature Findings – Intangible Asset Value

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Market Value of Intangibles	Dowell, Hart & Yeung	"Do Corporate Global Environmental Standards Create or Destroy Market Value" *Management Science*, 2000	▪ Firms with stringent, beyond-compliance environmental standards have significantly higher market values (10 percent or $8.4 billion to $10.6 billion), than firms with U.S. standards only – (89 Standard & Poor's (S&P) 500 companies with manufacturing or mining operations in developing countries)
	Konar & Cohen	"Does the Market Value Environmental Performance" *Rev. Econ & Statistics*, 2001	▪ Average "intangible asset liability" for inferior environmental performance estimated at $380 million ▪ Liability greatest for chemical, primary metals, and paper industries ▪ Ten-percent reduction in Toxics Release Inventory (TRI) produces $34 million in intangible asset value – (321 S&P 500 manufacturing firms)

Within the past 10 to 15 years, several independent organizations began identifying and providing information on environmental performance. Many of these organizations market their products to the investment community. The most prominent screening and rating tools are the Eco-Value 21® method developed by Innovest Strategic Value Advisors, the reporting guidelines issued by Global Reporting Initiative (GRI), the Dow Jones Sustainability Index (DJSI), and the FTSE4Good Index. These environmental screening and rating tools and methodologies are among the few that specifically address environmental management systems (EMSs).

Exhibit 3 presents data from two studies that examined the performance of investment portfolios that use environmental screening and rating tools and methodologies. Both documented the absence of "performance penalties." While these findings do not demonstrate that more environmentally advanced firms outperform otherwise similar firms, they do provide support for overcoming a significant barrier to environmentally influenced investing—fiduciary duty to the investor.

Exhibit 3. Major Literature Findings –
Performance of Environmentally Screened Investment Portfolios

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Environ-mental Quality Ratings and Screens	Cohen, Fenn & Naimon	"Environmental and Financial Performance: Are they Related?" Investor Responsibility *Research Center* 1995	▪ Environmental leaders in an industry-balanced portfolio did as well as, and sometimes better than, environmental laggards
	Stone, Guerard, *et al*	"Socially Responsible Investment Screening: Strong Evidence of No Significant Cost for Actively Managed Portfolios." 2003	▪ No cost to social and environmental screening for actively managed portfolios—even if controlling for a variety of factors – (Quarterly returns over 13 years for 1,334 stocks using environmental screens; 20 different portfolios constructed, controlling for size, Beta, growth, and dividend yield)

Most investors do not regularly seek, review, or consider environmental management or performance during decision making. Nonetheless, environmental issues do affect the stock market and company valuations. As shown in Exhibit 4, several studies have documented short- to medium-term stock price/market value effects from positive and negative environmental events. Media coverage based on actual and potential environmental legislation decreased the share price of affected companies significantly. EPA announcements about enforcement priorities and negative news releases had similar effects. In contrast, positive publicity on environmental performance (e.g., awards, recognition) increased share prices.

Exhibit 4. Major Literature Findings – Stock Price Impacts of Environmental Events

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Stock Price Impacts (Event Methodology Studies)	Blacconiere & Patten	"Environmental Disclosures, Regulatory Costs, and Changes in Firm Value" *Journal of Accounting & Economics* 1994	▪ Companies dependent on chemical business suffered significant declines in share price returns, while those deriving less than 18 percent of their revenues from chemicals had no effect ▪ Companies with best disclosure were not affected, while companies with worst had significant negative returns – (47 companies obtaining less than 10 percent of their revenue from chemicals; Form 10Ks reviewed, companies put into five categories relative to extent of environmental disclosures)

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
	Blacconiere & Northcut	"Environmental Information and Market Reactions to Environmental Legislation" Auditing and Finance 1997	▪ Chemical companies likely to be negatively affected by environmental legislation suffered share price declines – (72 chemical companies during 8-month period around Superfund Amendments and Reauthorization Act (SARA) reauthorization)
	Bosch, et al	"Environmental Regulation and Stockholder Wealth" *Managerial and Decision Economics* 1998	▪ Firms targeted for EPA enforcement had stock price declines when the action was announced – (News references from *Wall Street Journal* collected over 20-year period; 171 cases, 77 firms)
	Hamilton	"Pollution as News: Media and Stock Market Reactions to the Toxic Release Inventory Data" *J. of Environmental Economics and Management* 1995	▪ Firms with negative news coverage on Toxics Release Inventory (TRI) experienced a significant decline in stock price, losing an average of $4.1 million the first day of news coverage. Stock prices declined an average of $6.2 million with additional coverage – (450 New York Stock Exchange and American Stock Exchange companies reported under TRI with complete stock return information)
	Klassen & McLaughlin	"The Impact of Environmental Management on Firm Performance" *Management Science* 1996	▪ Firms with environmental awards increased in market value (0.63 percent), while firms with negative publicity declined in value (-0.82 percent) ▪ Filtering out contemporaneous events by firms showed more acute impacts (0.82 percent, -1.50 percent), with average annual gain of $80.5 million or loss in market value of $390.5 million – (Nexis database search 1985-91, yielding 140 award announcements, 22 crisis stories)

Two other noteworthy studies evaluated stock market behavior in response to environmental characteristics. Exhibit 5 shows these studies' major findings—both focus on the cost of equity capital as reflected by a firm's Beta, a measure of stock price volatility. One study documents a positive impact on the Beta (a lowering) due to better environmental management (i.e., environmental management system implementation) and performance. The other shows a negative impact (higher Beta) for a large company in the same industry as several other firms with substantial Superfund liabilities. This type of "guilt by association" is commonly observed in the stock market.

Exhibit 5. Major Literature Findings – Environmental Impacts on Cost of Capital

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Beta and Firm Cost of Capital	Feldman, Soyka & Ameer	"Does Improving a Firm's Environmental Management System and Environmental Performance Result in a Higher Stock Price" *Journal of Investing* 1997	▪ Improved environmental management and performance (Toxics Release Inventory/fixed assets) decreased Beta by several percent, suggesting lower firm cost of capital and higher stock price – (330 Standard &Poor's 500 firms examined across two 7-year periods; analysis controlled for capital structure, productivity, industry, and other important variables)
	Garber & Hammitt	"Risk Premiums for Environmental Liabilities: Superfund and the Cost of Capital." *Journal of Environmental Economics and Management* 1998	▪ Higher Superfund liability for an industry subset increased the cost of capital for other large industry firms ▪ The annual capital cost for 23 affected firms was 0.25 to 0.4 percent from 1988-92 – (72 publicly traded chemical industry potentially responsible parties (PRPs) identified over 12-year period; 23 large, 54 small firms (less than $500 million in market value)

Last, Exhibit 6 presents findings on the importance (or lack thereof) of environmental issues in investment analysis and decision making. A 1998 survey of investors found that most investors, whether or not they represent environmentally screened investment products, do not routinely request information on environmental policies, management systems, performance, or other related issues. However, the survey also found that investors seek value and will pay more for it if there is convincing evidence. They also expect to receive information on such value creation means from company management, whether it is requested or not. A 2004 study suggested the investor community is becoming more aware of environmental and other corporate social responsibility issues. As demonstrated by the Steering Group's primary research, however, this awareness has not yet generated significant investment inquiry, analysis, and decision making related to environmental issues.

Exhibit 6. Major Literature Findings – Surveys of Investor Attitudes and Beliefs

Financial Impact Category	Author(s)	Title, Source, and Date	Major Findings and Limitations
Surveys - Investors	Soyka & Feldman	"Investor Attitudes Toward Corporate Environmentalism: New Survey Findings" *Environmental Quality Management* 1998	▪ Vast majority of portfolio managers would pay more for strong environmental performance, given convincing demonstration of value creation ▪ While virtually no investors routinely asked for environmental health and safety (EH&S) program cash flow contribution, almost all expected company management to offer information on EH&S value creation without prompting – (45 U.S. bond and equity portfolio managers, both environmentally screened and mainstream)
	United Nations Environment Programme Finance Initiative	"The Materiality of Social, Environmental, and Corporate Governance Issues to Equity Pricing" 2004	▪ Investors agree that environmental, social, and corporate governance issues affect long-term shareholder value; some impacts can be profound – (Survey of 11 brokerage houses)

Appendix B: Principal Financial Market Contacts

Person	Organization/Affiliation	Financial Market Sector	Brief Rationale for Contact
Kim Hanna Pat Mount Kevin Mathews	AIG Environmental, Inc.	Insurance	Chief Underwriting Officer, Manager, Engineering Program, and Director of Association and Government Relations of environmental subsidiary of world's largest insurance underwriter
Lawrence Heim	Marsh, Inc.	Insurance	Senior environmental expert in world's largest insurance brokerage, which operates major environmental insurance arm; past participant in EPA EMS-related dialogues
Karl Russek	ACE Environmental, Inc.	Insurance	President of environmental subsidiary of $18 billion global insurance carrier
Greg Shields	XL Environmental, Inc.	Insurance	Risk Control Manager of Environmental subsidiary of XL Capital, a major global insurance underwriter
Anonymous*	Anonymous*	N/A	SRI section of a major financial institution; manages separate accounts for specific clients. $1 billion in SRI assets
Anonymous*	Anonymous*	N/A	SRI mutual fund with multiple billions of dollars in assets
Julie Fox Gorte	Calvert Group	Equity/Fixed Income Investing	Vice President, Chief Social Investment Strategist at major SRI firm with extensive understanding of how environmental issues affect investment screening decisions
Paul Hilton	Dreyfus	Equity Investing	Fund Manager at firm with $900 million in SRI investments, $180 billion in total
Lloyd Kurtz	Nelson Capital Management	Equity Investing	Quantitative focus, mainstream portfolio manager, deep knowledge of SRI and quantitative studies of SRI
David Loewing	Citizens Funds	Equity Investing (SRI)	Senior SRI researcher with extensive experience evaluating and interacting with companies
Meredith Miller Don Kasebaum	State of Connecticut Treasurer's Office	Equity/Fixed Income Investing	Treasurer is principle fiduciary for the state pension plans

Person	Organization/Affiliation	Financial Market Sector	Brief Rationale for Contact
Amy Muska O'Brien	TIAA-Cref	Equity/Fixed Income Investing	Strategic planning official with strong background in SRI at this very large institutional investor
Bill Page	State Street Global Advisors	Equity Investing	Portfolio manager at large mainstream and SRI investment firm; user of environmental research (e.g., Innovest reports)
George Wong	New York State Comptroller's Office	Equity/Fixed Income Investing	Comptroller is principle fiduciary for the state pension plans
Anonymous*	Anonymous*	Company & Security Analysis	Large quantitative analysis house and index provider
Eric Ferneld	KLD Analytics	Company & Security Analysis	Can represent SRI research process and speak to interests of SRI users of KLD data
Bruce Klafter	Applied Materials, Inc.	Corporate	Senior EH&S Director at major manufacturer; firm is relatively new to CSR and reporting but moving fast
Paula Norton	United Parcel Service	Corporate	Director of Investor Relations at innovative leadership company
Ben Packard	Starbucks	Corporate	Director of Environmental Affairs at firm with non-traditional approach to environment and sustainability issues
Dave Stangis	Intel	Corporate	Perhaps the company official most "plugged in" to the SRI industry
Jeffrey Smith	Cravath, Swain & Moore	Independent Expert	Corporate environmental attorney and expert on Sarbanes-Oxley and U.S. Securities and Exchange Commission disclosure requirements

* Note: All three "anonymous" interviewees are employed by large, well-known financial services industry firms.

Appendix C: Environmental Management Systems Overview

An environmental management system (EMS) is a systematic approach to dealing with the environmental aspects of an organization. It provides the structure by which an organization's activities can be carried out efficiently and effectively, while minimizing negative impact on the environment. More specifically, an EMS is a cyclical process of planning, implementing, checking, and continually improving a system and its elements, with the concept of continual improvement as a key EMS component.

An effective EMS ensures that environmental considerations are integrated into an organization's overall decision-making structure, and environmental responsibilities are deployed throughout the organization. Unlike traditional environmental management, which consists of a small group of environmental professionals trying to manage all of an organization's environmental impacts, an EMS demands that all employees take responsibility for the potential environmental impacts of their own activities. Employees accomplish this task by examining their activities, determining potential impacts, and finding ways to minimize those impacts.

Environmental aspects are elements of an organization's activities, products, or services that can interact with the environment.

By adopting an EMS, an organization can potentially discover many opportunities to reduce wasteful use of resources, thus saving money and enhancing economic performance while reducing environmental impacts.

Benefits

Organizations that implement effective EMSs will see improvement in their environmental programs and overall environmental performance. However, these benefits can vary. Depending on the size and complexity of the facility, the maturity and extent of pre-existing environmental programs, the organization's mission, and the design and goals of the EMS, benefits can include management efficiencies and organizational improvements.

More common benefits include:

- Improved environmental performance;
- Improved regulatory compliance;
- Greater prevention of pollution and resource conservation;
- Increased efficiency;
- Improved procedures and documentation leading to operational consistency;
- Enhanced employee morale;
- Increased safety and decreased accidents;

- Reduced liability;
- Enhanced image and better relationships with the public, regulators, and stakeholders;
- Improved employee awareness of environmental issues and responsibilities;
- Reduced environmental management costs; and
- Access to international markets.

EMS Framework

The most commonly used EMS framework is the one developed by the International Organization for Standardization (ISO). Established in 1996 and revised in 2004, the ISO 14001 standard "*Environmental management systems—Specification with guidance for use*" is located within the ISO 14000 series, and specifies the actual requirements for an EMS. It is the only standard within the series that can currently be used for certification by an external certification authority. It does not state specific environmental performance criteria, but does provide management system elements for determining conformity with the standard.

Elements of an ISO 14001 EMS

The five main stages of an EMS, as defined by the ISO 14001 standard, are:

1. ***Commitment and Policy***

   - Defining an environmental policy that reflects the commitment of the organization and drives the EMS.

2. ***Plan***

   - Identifying legal and other requirements.
   - Assessing how the organization potentially impacts the environment through identification of environmental aspects and impacts of the organization's activities, products, and services.
   - Determining the environmental aspects that are significant to the organization based on criteria set by the organization.
   - Defining objectives to reduce the environmental impact of significant environmental aspects.
   - Setting a measurable target for each objective.

3. ***Do (Implementation)***

   - Developing programs to make desired changes in processes, work procedures, or procurement to meet targets.
   - Developing and managing operational controls to minimize environmental impact, for significant environmental aspects that are not tied to an objective.
   - Assigning roles and responsibilities and developing training, communication, documentation, and an emergency management plan to ensure environmental targets are met.

4. Check

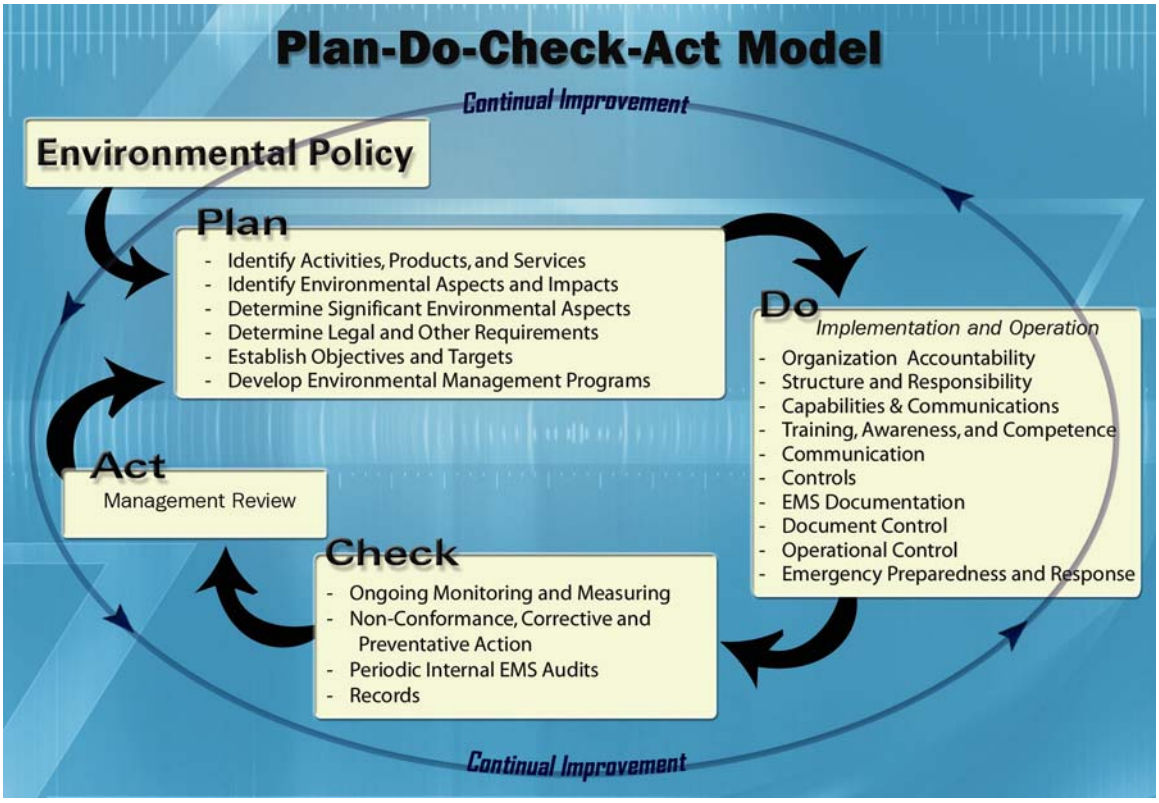
- Reviewing progress toward meeting objectives and targets.
- Measuring success in meeting targets.
- Conducting audits.
- Taking corrective action if needed.

5. Act

- Reviewing an EMS to ensure its continuing suitability, adequacy, and effectiveness (done by an organization's top management).
- Modifying an EMS to optimize its effectiveness.

For More Information

For more information on EPA's EMS-related policies, technical assistance and outreach programs, and other initiatives, visit www.epa.gov/ems.



Appendix D: Glossary

Aspect: an element of an organization's activity, product, or service that can interact with the environment

Beta: a measure of a given company's stock price volatility over time. Higher Betas imply a higher cost of equity capital (return required by the investor); a higher required return implies a lower stock price

Domini 400: a market capitalization-weighted common stock index; monitors the performance of 400 U.S. corporations that pass multiple, broad-based social screens

Dow Jones Sustainability Index: an index that tracks the financial performance of leading sustainability-driven companies worldwide

Environmental Management System (EMS): a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency

Equity: stock or any other security representing an ownership interest; on a balance sheet, the amount of the funds contributed by owners (stockholders) plus retained earnings (or losses)

Fiduciary Duty: the legal responsibility for investing money or acting wisely on behalf of another

Financial Incentive: an expression of economic benefit that motivates behavior

Firm Cost of Capital: actual cost of capital of a firm; would include the cost of debt and the cost of equity

FTSE4Good: measures the performance of companies that meet globally recognized corporate responsibility standards, and facilitates investment in those companies

Global Reporting Initiative (GRI): a multi-stakeholder process and independent institution whose mission is to develop and disseminate globally applicable sustainability reporting guidelines; guidelines are for voluntary use by organizations reporting on the economic, environmental, and social dimensions of their activities, products, and services

Index: an imaginary portfolio of securities representing a particular market or a portion of it

Intangible Assets: the characteristics and abilities not found on an organization's balance sheet, or captured by conventional accounting measures

ISO 14000: a series of international, voluntary environmental management standards that address the following aspects of environmental management: EMSs, environmental auditing & related investigations, environmental labels and declarations, environmental performance evaluation, life-cycle assessment, and terms and definitions

ISO 14001: the standard within ISO 14000 that specifies the actual requirements for an environmental management system; the only standard within the series that can currently be used for certification by an external certification authority. It does not state specific environmental performance criteria, but does provide management system elements for determining conformity with the standard

Net Margin: net profit divided by net revenues, often expressed as a percentage; can indicate how effective a company is at cost control

Pollution Legal Liability (PLL): legal responsibility for environmental risk

Return on Assets: a company's annual earnings divided by its total assets, often expressed as a percentage; can indicate how profitable a company is relative to its total assets and/or how well a company is able to use its assets to generate earnings

Return on Investment: benefit (return) of an investment divided by the cost of the investment, often expressed as a percentage or ratio; can be used to evaluate the efficiency of an investment

Socially Responsible Index: passively managed mutual funds comprised of companies whose activities are considered ethical; can offer competitive performance with lower expense compared to actively managed SRI funds

Socially Responsible Investing (SRI): investing in companies whose activities are considered ethical

Toxics Release Inventory (TRI): a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities

Value Creation: performing activities that increase the value of goods or services to consumers

Volatility: a statistical measure of the tendency of a market or security to rise or fall sharply within a set period